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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.  | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------|------------------|
| 10/750,348   | 12/31/2003  | Rongxiang Hu         | 01-377/ID/LS11P180D1 | 9464             |
| 24319  | 7590        | 06/30/2005           | EXAMINER             |                  |
| LSI LOGIC CORPORATION<br>1621 BARBER LANE<br>MS: D-106<br>MILPITAS, CA 95035 |             |                      | NHU, DAVID           |                  |
|  |             |                      | ART UNIT             | PAPER NUMBER     |
|  |             |                      | 2818                 |                  |

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                               |                           |  |
|------------------------------|-------------------------------|---------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/750,348 | Applicant(s)<br>HU ET AL. |  |
|                              | Examiner<br>David Nhu         | Art Unit<br>2818          |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 4, 5, 15 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-14 and 17-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

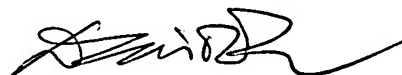
### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10/025,304.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTIONS

### *Drawings*

1. There are no descriptions of layers (716, 1316, 1816) in figures 7-8, 13-16, 20-12). Also, there is no a trench opening 1508 in figure 16..

### *Double Patenting*

2. **Claims 1** of the application No. 10/750,348 is rejected under the judicially created doctrine of obviousness-type double patenting over **claim 1 of U. S. Patent No. 6,713,386 B1** since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent. *The subject matter claimed in the instant application and similar language recited in the patent claims obviously depict a similar method having either same steps and/or same materials, and such is also disclosed in both the patent and the instant application.*

### *Claims Objection*

3. *claim 1, "the low-K dielectric layer" lacks a clear antecedent basis.*

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6-14, 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Background of Invention (BOI).

**Regarding claim 1**, BOI, (see figures 1-4, pages 1-4), teaches a method for forming a dual damascene interconnect in a dielectric, comprising: etching a first aperture 304 in

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the dielectric layer 204; forming a poison barrier layer 212 over part of the dielectric layer, which prevents resist 220 poisoning; forming a patterned mask 224 over the poison barrier layer; and etching a second aperture 416 into a low-K dielectric layer, wherein at least part of the first aperture shares the same area as at least part of the second aperture (see figure 4).

Regarding claims 2-3, 7-14, 17-20, BOI, also teaches one aperture is within another aperture (see figure 4); the first aperture is a via and the second aperture is a trench wherein the via is within the trench (see figure 40); forming of the poison barrier layer comprises chemical treating surface with a solution of a pH; forming the poison barrier layer comprises forming nitrogen free barrier over surfaces of the first aperture (see figures 1, 2); wherein the dielectric is a low-k dielectric; placing a copper diffusion barrier layer over surfaces of the first aperture and the second aperture; forming the poison barrier layer comprises forming a nitrogen free silicon oxide layer.

### **Conclusion**

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Chooi'824 is cited as of interest.

7. A shortened statutory period for response to this action is set to expire 3 (three) months from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on

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Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*Information regarding the status of an application may be obtained from the patent application information retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).*

David Nhu



June 27, 2005